

# World's 1st Automotive Grade HomePlug Green PHY From Lumissil



This article provides an overview of Lumissil's HomePlug Green PHY (HPGP) IC product, IS32CG5317. Lumissil Connectivity team developed IS32CG5317 product to be the 1st single-chip automotive grade HPGP solution for the fast growing EV charging market.

Lumissil Connectivity team leveraged experience from previous HomePlug AV (HPAV) IC products, and focused on designing an HPGP product for EV charging; suited for application inside both vehicle and charging station.

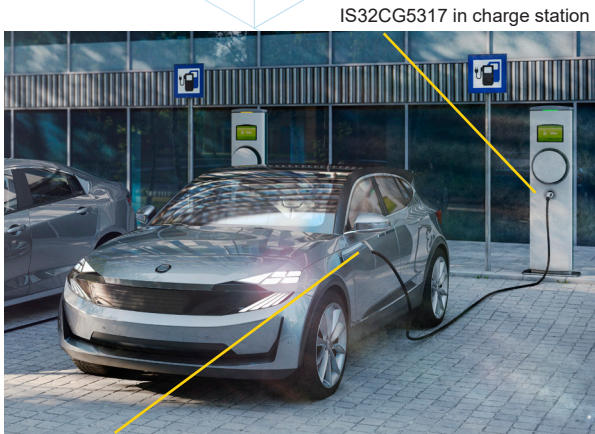


FIGURE 1 - IS32CG5317 IN EV/EVSE APPLICATION

## DESIGNED FOR EV CHARGING

IS32CG5317 is designed to meet all the requirements of HomePlug Green PHY specification. The same chip can be enabled for HPAV and IEEE 1901 compliance by firmware in the future when higher data rates is needed. Table below summarize the HPGP PHY parameters.

| Parameter                     | HPGP                      |
|-------------------------------|---------------------------|
| Spectrum                      | 2 MHz to 30MHz            |
| Modulation                    | OFDM                      |
| # of Subcarriers              | 1155                      |
| Subcarrier spacing            | 24.414 KHz                |
| Subcarrier modulation formats | QPSK only                 |
| Data FEC                      | Turbo code: Rate 1/2 only |
| Supported data rates          | ROBO: 4 to 10Mbps         |

TABLE 1 - HPAV AND HPGP PHY PARAMETERS

IS32CG5317 is a single chip with AFE (Analog-Front End) signal conditioner and baseband modem integrated. It requires a single 3.3V DC supply, a single 25MHz crystal and has SPI or MII/RMII interfaces for connection to host processor (MCU or MPU). The HPGP line interface transmits power of 0dBm with  $\pm 1$  dB flatness accuracy for automotive EV charging application and can optionally utilize an external line driver (amplifier) for additional boost.

The IS32CG5317 support all the new requirements of the automotive market and brings value to automotive and Charger subsystem OEMs and Tier-1 Manufacturers. The Lumissil IS32CG5317 is AEC-Q100 Grade 2 qualified and suited for operation in -40°C to 105°C ambient temperature. Lumissil Quality Management System (QMS) is certified to ISO 9001:2015 which includes design, development, and provision of semiconductor components, intellectual properties, and software tools. All the foundry, assembly, and test sites that manufacture this automotive device, IS32CG5317, are operating a QMS that is certified to IATF 16949 in addition to ISO 9001:2015.

## World's 1st Automotive Grade Home-Plug Green PHY From Lumissil

IS32CG5317 is also compliant to ISO/IEC 15118 and DIN 70121 which are the North American and European Union communication standards for charging of electric vehicles respectively.

Other IS32CG5317 features beneficial to both Automotive and Charger Customers includes:

- Automotive Software Performance Improvement and Capability determination (ASPICE) compliant
- Low-cost
- Low power consumption
- Package is 80-pin EP-LQFP which enables visual inspection after production, high PCB reliability (the gull wing shaped pins absorbs vibrations and PCB bending)
- EMC friendly features like configurable pin output drive strength
- SPI interface is capable of supporting up to 50MHz frequency
- Enhanced diagnostics capabilities: SNR, Noise, Channel estimation, gain, along with various statistics
- Ability to stream diagnostic logs to Host processor periodically
- HPGP output signal's Power Spectrum Density (PSD) calibration is simplified. This improves manufacturing efficiency and reduces costs
- Embedded PVT (Process, Voltage, Temperature) sensor provide status of IS32CG5317's die operational conditions
- Embedded eFUSE, a One-Time-Program (OTP) memory to store die specific info.
- Firmware can be loaded from the host processor or an optionally connected flash memory. The flash could also serve as storage for other data

In order to ensure Automotive and Charger customers smooth transition (from the incumbent HPGP part from Qualcomm) or adoption of IS32CG5317, Lumissil Connectivity team is working with multiple Automotive Software Providers and Processor vendors to create value packages in terms of development time and costs savings. The Lumissil Connectivity team is committed to support customers throughout their development cycle from concept to schematics/layout, SW coding reviews and prototype testing; ensuring final product's HPGP compliance and business success.

On May 4th, 2021, Lumissil announced the Continental-Vitesco selection of IS32CG5317 HPGP. Currently, a large

number of other Automotive and Charger Tier-1s and OEMs are engaged to develop new products based on IS32CG5317.

Lumissil is a member of CHARIN, the leading global association dedicated to the promotion of interoperability based on the Combined Charging System (CCS) as the global standard for charging vehicles of all kinds.

### PRODUCT ORDERING AND AVAILABILITY

Lumissil HPGP ordering part numbers:

| Part Number         | Packaging     |
|---------------------|---------------|
| IS32CG5317-LQLA2    | Tray          |
| IS32CG5317-LQLA2-TR | Tape and Reel |

IS32CG5317 Samples and development kit will be available in Q4 2021; mass production begins in April 2022.

Lumissil connectivity team is committed to provide IS32CG5317 customers strong technical support and abide to ISSI company's mission to maintain long-term support.

### CONTACT:

Questions or feedback may be sent to:

Allan Chan

Lumissil Microsystems

Connectivity Products and Applications Manager

allan\_chan@lumissil.com